AM1DS-RZ

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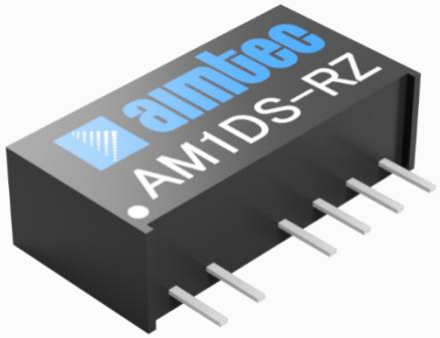


SIP7 Package

The AM1DS-RZ is a new 1W SIP7 DC/DC converter that offers high product quality by the improved manufacturing process. It also features excellent reliability and performance while offering a standard input voltage range of 3.3-24VDC as well as an output voltage range of 3.3-15V. This compact SIP7 design will surely benefit your new system design.

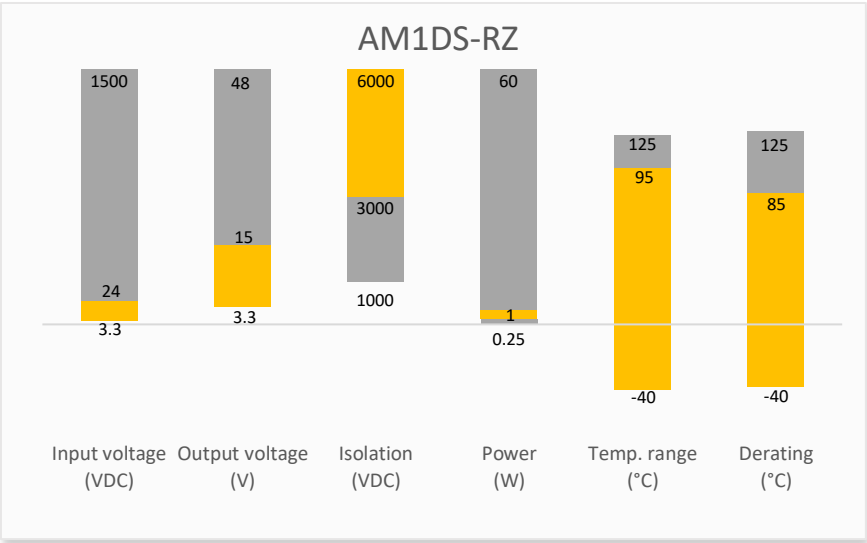
This new series offers great operating temperatures, from -40 to 95°C with full power up to 90°C. Also, isolation of 3000 and 6000VDC options for high reliability and system safety as well as a great 2,500,000h MTBF come standard.

The AM1DS-RZ is suitable for instrumentation, industrial controls, industrial digital isolation applications, isolated communication interface and IoT applications.

Features

- High I/O Isolation of 3000/6000VDC
- Continuous Short circuit protection
- Operating Temp: -40 °C to +95 °C
- Industry standard SIP7 pin-out
- Efficiency up to 84%
- Unregulated output
- Functional insulation

Summary



Training

Product Training Video (click to open)

Press Release

Coming Soon!

Application Notes

Applications

IoT

Industrial

Telecom

Portable Equipment

Models & Specifications

Single Output

Model	Input Voltage (VDC)	Output Voltage (VDC)	Input Current Full | No load typ. (mA)	Output Current max (mA)*	Isolation (VDC)	Maximum capacitive Load (µF)	Efficiency Typ. (%)
AM1DS-0303SH30RZ	3.3 (2.97-3.63)	3.3	393 / 55	303	3000	3300	77
AM1DS-0305SH30RZ	3.3 (2.97-3.63)	5	383 / 55	200	3000	2200	79
AM1DS-0312SH30RZ	3.3 (2.97-3.63)	12	369 / 70	83	3000	470	82
AM1DS-0315SH30RZ	3.3 (2.97-3.63)	15	388 / 85	66	3000	470	78
AM1DS-0503SH30RZ	5 (4.5-5.5)	3.3	259 / 40	303	3000	3300	77
AM1DS-0505SH30RZ	5 (4.5-5.5)	5	246 / 35	200	3000	2200	81
AM1DS-0512SH30RZ	5 (4.5-5.5)	12	243 / 45	83	3000	470	82
AM1DS-0515SH30RZ	5 (4.5-5.5)	15	243 / 55	66	3000	470	82
AM1DS-1203SH30RZ	12 (10.8-13.2)	3.3	105 / 20	303	3000	3300	79
AM1DS-1205SH30RZ	12 (10.8-13.2)	5	102 / 25	200	3000	2200	81
AM1DS-1212SH30RZ	12 (10.8-13.2)	12	102 / 30	83	3000	470	81
AM1DS-1215SH30RZ	12 (10.8-13.2)	15	105 / 35	66	3000	470	79
AM1DS-2403SH30RZ	24 (21.6-26.4)	3.3	53 / 15	303	3000	3300	78
AM1DS-2405SH30RZ	24 (21.6-26.4)	5	50 / 15	200	3000	2200	82
AM1DS-2412SH30RZ	24 (21.6-26.4)	12	49 / 15	83	3000	470	84
AM1DS-2415SH30RZ	24 (21.6-26.4)	15	50 / 20	66	3000	470	82
AM1DS-0303SH60RZ	3.3 (2.97-3.63)	3.3	393 / 55	303	6000	3300	77
AM1DS-0305SH60RZ	3.3 (2.97-3.63)	5	383 / 55	200	6000	2200	79
AM1DS-0312SH60RZ	3.3 (2.97-3.63)	12	369 / 70	83	6000	470	82
AM1DS-0315SH60RZ	3.3 (2.97-3.63)	15	388 / 85	66	6000	470	78
AM1DS-0503SH60RZ	5 (4.5-5.5)	3.3	259 / 40	303	6000	3300	77
AM1DS-0505SH60RZ	5 (4.5-5.5)	5	246 / 35	200	6000	2200	81
AM1DS-0512SH60RZ	5 (4.5-5.5)	12	243 / 45	83	6000	470	82
AM1DS-0515SH60RZ	5 (4.5-5.5)	15	243 / 55	66	6000	470	82
AM1DS-1203SH60RZ	12 (10.8-13.2)	3.3	105 / 20	303	6000	3300	79
AM1DS-1205SH60RZ	12 (10.8-13.2)	5	102 / 25	200	6000	2200	81
AM1DS-1212SH60RZ	12 (10.8-13.2)	12	102 / 30	83	6000	470	81
AM1DS-1215SH60RZ	12 (10.8-13.2)	15	105 / 35	66	6000	470	79
AM1DS-2403SH60RZ	24 (21.6-26.4)	3.3	53 / 15	303	6000	3300	78
AM1DS-2405SH60RZ	24 (21.6-26.4)	5	50 / 15	200	6000	2200	82
AM1DS-2412SH60RZ	24 (21.6-26.4)	12	49 / 15	83	6000	470	84
AM1DS-2415SH60RZ	24 (21.6-26.4)	15	50 / 20	66	6000	470	82

*** Performance will be degraded if the load is not within the output current range.**

Dual Output

Model	Input Voltage (VDC)	Output Voltage (VDC)	Input Current Full | No load typ. (mA)	Output Current max (mA)*	Isolation (VDC)	Maximum capacitive Load (µF)	Efficiency Typ. (%)
AM1DS-0303DH30RZ	3.3 (2.97-3.63)	±3.3	393 / 60	±151	3000	±1680	77
AM1DS-0305DH30RZ	3.3 (2.97-3.63)	±5	388 / 70	±100	3000	±1000	78
AM1DS-0312DH30RZ	3.3 (2.97-3.63)	±12	393 / 75	±41	3000	±220	77
AM1DS-0315DH30RZ	3.3 (2.97-3.63)	±15	388 / 75	±33	3000	±220	78

AM1DS-0503DH30RZ	5 (4.5-5.5)	±3.3	256 / 40	±151	3000	±1680	78
AM1DS-0505DH30RZ	5 (4.5-5.5)	±5	246 / 40	±100	3000	±1000	81
AM1DS-0512DH30RZ	5 (4.5-5.5)	±12	253 / 45	±41	3000	±220	79
AM1DS-0515DH30RZ	5 (4.5-5.5)	±15	256 / 45	±33	3000	±220	78
AM1DS-1203DH30RZ	12 (10.8-13.2)	±3.3	104 / 25	±151	3000	±1680	80
AM1DS-1205DH30RZ	12 (10.8-13.2)	±5	101 / 25	±100	3000	±1000	82
AM1DS-1212DH30RZ	12 (10.8-13.2)	±12	105 / 30	±41	3000	±220	79
AM1DS-1215DH30RZ	12 (10.8-13.2)	±15	101 / 25	±33	3000	±220	82
AM1DS-2403DH30RZ	24 (21.6-26.4)	±3.3	52 / 15	±151	3000	±1680	80
AM1DS-2405DH30RZ	24 (21.6-26.4)	±5	50 / 15	±100	3000	±1000	82
AM1DS-2412DH30RZ	24 (21.6-26.4)	±12	53 / 20	±41	3000	±220	78
AM1DS-2415DH30RZ	24 (21.6-26.4)	±15	54 / 15	±33	3000	±220	77
AM1DS-0303DH60RZ	3.3 (2.97-3.63)	±3.3	393 / 60	±151	6000	±1680	77
AM1DS-0305DH60RZ	3.3 (2.97-3.63)	±5	388 / 70	±100	6000	±1000	78
AM1DS-0312DH60RZ	3.3 (2.97-3.63)	±12	393 / 75	±41	6000	±220	77
AM1DS-0315DH60RZ	3.3 (2.97-3.63)	±15	388 / 75	±33	6000	±220	78
AM1DS-0503DH60RZ	5 (4.5-5.5)	±3.3	256 / 40	±151	6000	±1680	78
AM1DS-0505DH60RZ	5 (4.5-5.5)	±5	246 / 40	±100	6000	±1000	81
AM1DS-0512DH60RZ	5 (4.5-5.5)	±12	253 / 45	±41	6000	±220	79
AM1DS-0515DH60RZ	5 (4.5-5.5)	±15	256 / 45	±33	6000	±220	78
AM1DS-1203DH60RZ	12 (10.8-13.2)	±3.3	104 / 25	±151	6000	±1680	80
AM1DS-1205DH60RZ	12 (10.8-13.2)	±5	101 / 25	±100	6000	±1000	82
AM1DS-1212DH60RZ	12 (10.8-13.2)	±12	105 / 30	±41	6000	±220	79
AM1DS-1215DH60RZ	12 (10.8-13.2)	±15	101 / 25	±33	6000	±220	82
AM1DS-2403DH60RZ	24 (21.6-26.4)	±3.3	52 / 15	±151	6000	±1680	80
AM1DS-2405DH60RZ	24 (21.6-26.4)	±5	50 / 15	±100	6000	±1000	82
AM1DS-2412DH60RZ	24 (21.6-26.4)	±12	53 / 20	±41	6000	±220	78
AM1DS-2415DH60RZ	24 (21.6-26.4)	±15	54 / 15	±33	6000	±220	77

*** Performance will be degraded if the load is not within the output current range.**

Input Specification

Parameters	Conditions	Typical	Maximum	Units
Filter	Capacitor			
Absolute maximum rating	Maximum duration 100ms, 3.3Vin		6	VDC
	Maximum duration 100ms, 5Vin		9	VDC
	Maximum duration 100ms, 12Vin		18	VDC
	Maximum duration 100ms, 24Vin		30	VDC
Input reflected ripple current*		20		mA pk-pk
Fuse (non-mandatory)	3.3Vin slow blow type	1		A
	5Vin slow blow type	0.5		A
	12Vin slow blow type	0.25		A
	24Vin, slow blow type	0.1		A

*** Measured with a simulated source inductance of 12µH and a source capacitor Cin (47µF, ESR<1Ω at 100KHz).**

Isolation Specification

Parameters	Conditions	Typical	Maximum	Units
Tested I/O voltage	60 sec, leakage ≤ 1mA for H30 models	>3000		VDC
	60 sec, leakage ≤ 1mA for H60 models	>6000		VDC
Resistance (I/O)		>1000		MΩ

Capacitance (I/O)			65	pF
Insulation type	Functional insulation			

Output Specification

Parameters	Conditions	Typical	Maximum	Units
Voltage accuracy	Nominal Vin		±3	%
Line regulation	Per 1% Vin change		±1.2	%
Load regulation	10-100% load, 3.3V / 5V output models		15	%
	10-100% load, 12V / 24V output models		10	%
Cross regulation	Asymmetrical load 25% / 100% for dual output, 3.3V / 5V input models		±6	%
	Asymmetrical load 25% / 100% for dual output, 12V / 24V input models		±4	%
Ripple & Noise*		100	150	mV pk-pk
Start-up time	Constant resistive load		10	ms
Temperature coefficient	Full load		±0.02	%/°C
* Ripple and Noise are measured at 20MHz bandwidth by using a 0.1µF MLCC.				

General Specifications

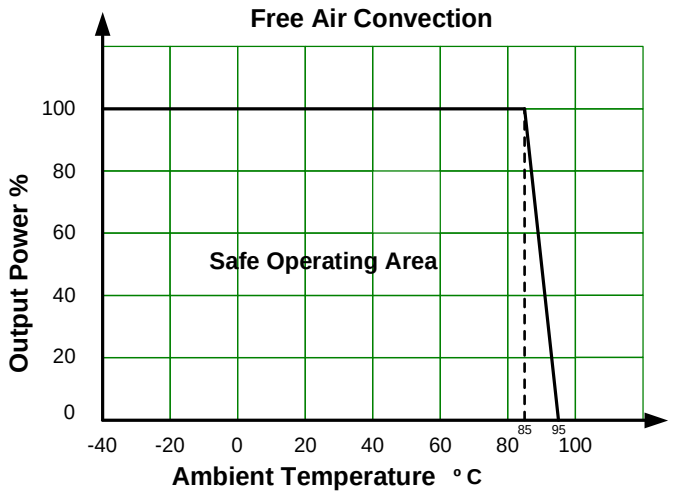
Parameters	Conditions	Typical	Maximum	Units
Switching frequency		100		KHz
Short circuit protection	Continuous, Auto recovery			
Operating temperature	With derating	-40 ~ +95		°C
Storage temperature		-40 ~ +125		°C
Case temperature			115	°C
Thermal impedance		>45		°C/W
Soldering temperature	1.5mm away from case, duration ≤ 10sec		260	°C
Cooling	Natural convection	>30	65	LFM
Humidity			95	% RH
Case material	Black plastic (flammability to UL 94V-0)			
Pin material	Tinned copper			
Potting material	Silicone (UL 94V-0)			
Weight		2.3		g
Dimensions (L x W x H)	0.76 x 0.24 x 0.39 inches (19.50 x 6.00 x 10.00 mm)			
MTBF	2 500 000 hrs (MIL-HDBK -217F, t=+25°C) / Full Load			
NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified.				

Safety Specifications

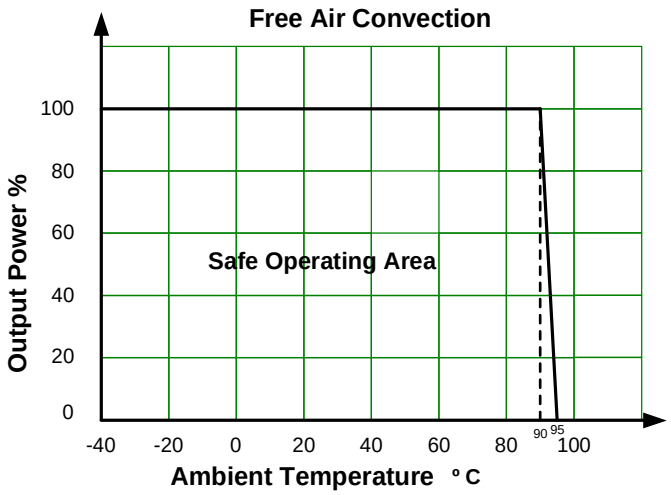
Parameters		
Agency approvals	CE, EN62368-1	
Standards	Information technology Equipment	Design to meet IEC/UL62368-1
	EMC - Conducted and radiated emission	EN55032, class B with the recommended EMI circuit
	Electrostatic Discharge Immunity	IEC 61000-4-2 Air ±15KV, Contact ±8KV, Criteria A
	RF, Electromagnetic Field Immunity	IEC 61000-4-3 10V/m, Criteria A
	Electrical Fast Transient/Burst Immunity	IEC 61000-4-4 ±2KV, Criteria A with the recommended EMI circuit
	Surge Immunity	IEC 61000-4-5 ±2KV, Criteria A with the recommended EMI circuit
	RF, Conducted Disturbance Immunity	IEC 61000-4-6 10Vr.m.s, Criteria A
	Power-frequency magnetic field Immunity	IEC 61000-4-8 100A/m, Criteria A

Derating

24Vin models

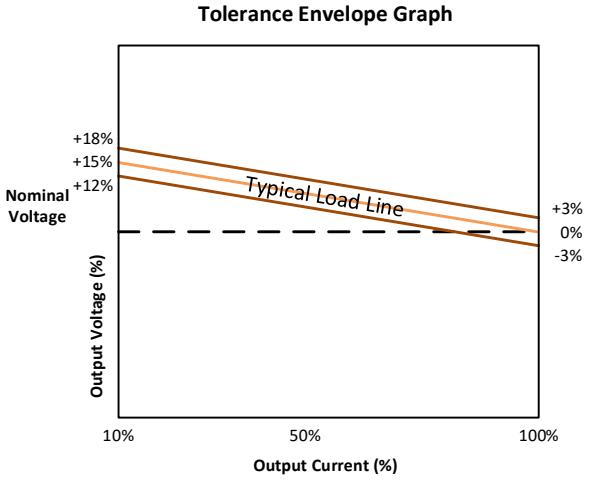


Others

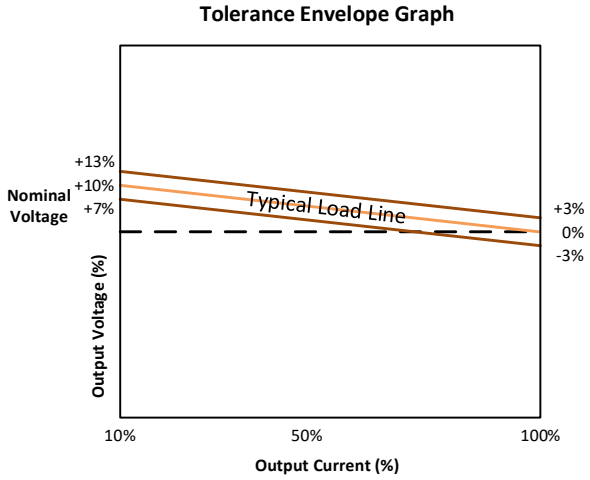


Output voltage tolerance

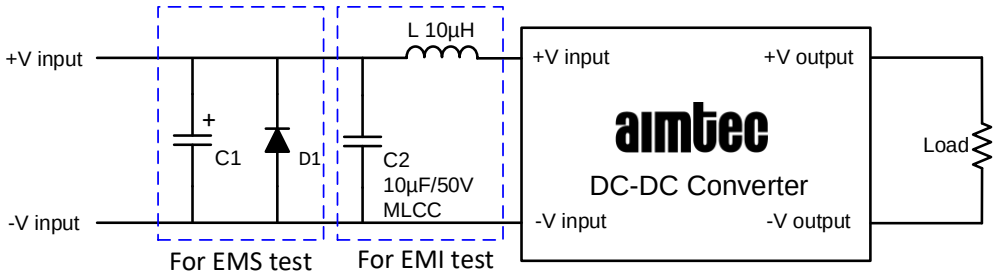
All 3.3/5Vout models



All 12/24Vout models

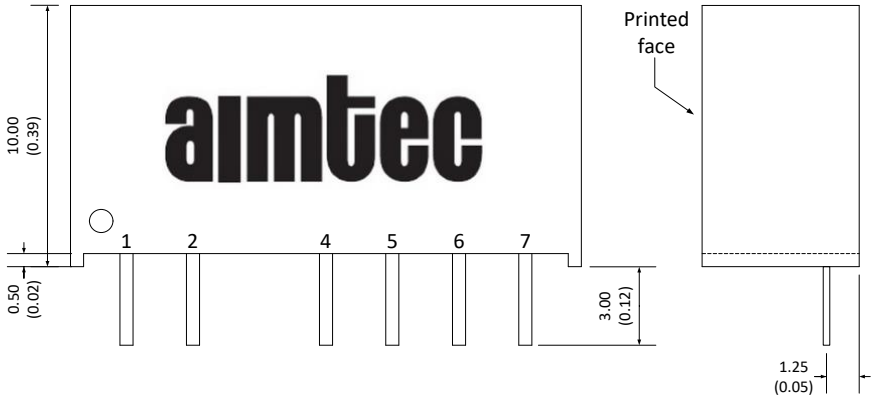


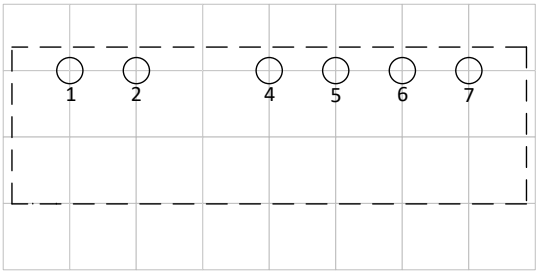
Recommended EMI circuit



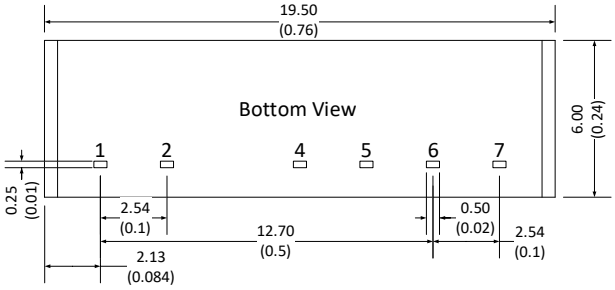
Vin	C1	D1
3.3V	NIPPON Chemi-con KY series 470µF/100V	SMDJ6A
5V		SMDJ9A
12V		SMDJ18A
24V	NIPPON Chemi-con KY series 680µF/100V	SMDJ30A

Dimensions





Grid size: 2.54*2.54mm
Through hold : Ø0.8 (0.031)
Top view pad : Ø1.0 (0.039)
Bottom view pad : Ø1.6 (0.063)



Note:
Unit: mm(inch)
General tolerance: ±0.5 (0.02)
Pin tolerance: ±0.05 (0.002)
Pin pitch and length tolerance: ±0.35 (0.014)

Pin Out Specifications				
Pin	3KV isolation Single output	3KV isolation Dual output	6KV isolation Single output	6KV isolation Dual output
1	+V Input	+V Input	+V Input	+V Input
2	-V Input	-V Input	-V Input	-V Input
4	-V Output	-V Output	No pin	No pin
5	No pin	Com	-V Output	-V Output
6	+V Output	+V Output	No pin	Com
7	No pin	No pin	+V Output	+V Output

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